Demand Collaboration is an extension of RHYTHM Collaboration Planner™ that enables the interaction of an organization with its multi-tiered distribution channel, by providing a seamless link between them. It does so by providing an interchange of intelligent information in real time over the Internet. Demand Collaboration addresses all aspects of multi-enterprise collaboration by enabling specific business processes for collaborative planning, execution, performance monitoring and process optimization.

Current Business Environment

Supply chains are becoming fragmented as companies divest manufacturing and logistics activities, concentrate on their core competencies and improve their cost structures. To meet customer needs effectively, these fragmented organizations must work together as a virtual enterprise. The only feasible mechanism to enable this is a constant synchronization of individual operational plans across all enterprises within the value chain, keeping them in step with the supply- and demand-side variability.

The key to multi-enterprise value chain synchronization is the interchange of intelligent information in real time across collaborating enterprises. This information must convey partner capabilities and constraints, rather than being limited to exchanging isolated points of information. This sharing of intelligent information in real time facilitates a richer interaction among collaborating partners. Even companies with less fragmented value chains are realizing that they can achieve a much higher level of value by collaborating with their trading partners. This leads to effective multi-enterprise "value chain" level optimizations, which improves the cost of operations as well as the market performance of all participants.

Thus, a multi-enterprise collaboration solution must focus on the collaborative business process, enabling decision-making in the short, medium and long term. This solution can then overcome the deficiencies of existing attempts at multi-enterprise solutions. For example, Electronic Data Interchange (EDI) systems are often open-looped, point-to-point interactions with batch processing of information. Similarly, Vendor Managed Inventory (VMI) and Supplier Managed Inventory (SMI) are often short-term replenishment focused with partners exhibiting inventory-shifting behavior.

i2 Technologies delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

DEMAND
collaboration

i2

What is Demand Collaboration?

Demand Collaboration is an extremely customizable business process model within RHYTHM Collaboration Planner that enables the entire set of activities related to moving finished goods within the multi-tiered distribution chain. Thus, Demand Collaboration enables the collaborative business to business interactions of an organization with its retailers, distributors, wholesalers and outbound third-party logistics operators.

The Demand Collaboration business process model supports a variety of configurable workflows that go into close-loop planning and execution for the short, medium and long term. Some typical workflows include:

- Collaborative planning
- Collaborative execution
- Collaborative performance monitoring
- Collaborative optimization

Key Benefits

Some of the unique features of Demand Collaboration include:

- Time-phased and exception-driven collaborative planning process
- Ability to model a multi-tiered and multi-party value chain
- Multi-dimensional view of business measures
- Support for diverse partner interfaces such as Web, EDI and XML as well as the ability to integrate with diverse APS and ERP/MRP systems
- User-defined exception conditions, business measures, computations based on business measures and business rules for exception handling
- Web browser based customizable user interface and rich reporting with automated data upload/download capability
- Robust Internet security framework and fine-grained user permissibility framework

- Channel synchronization and seller centric auction of ATP
- Product substitution capability

Demand Collaboration Technology

Demand Collaboration leverages the open, flexible, secure and highly scalable technological infrastructure provided by RHYTHM Collaboration Planner. Thus, Demand Collaboration is compliant with relevant industry standards such as EDI, XML, RosettaNet, Java, CORBA, DCOM, HTTP/S, SQL and OMDG. It is also an extremely fault-tolerant system, having the capability of near 24X7 operation, with support for failover and load balancing.

Demand Collaboration can be deployed as a conventionally licensed software. It can also be accessed as a subscription-based service in RHYTHM eXchange, enabling an Internet-based trading community.

Delivering Value

The realized value of Demand Collaboration is a direct function of the extent to which its richness is utilized within the collaborative business processes of the value chain. Therefore, the value is determined by the extent to which the following elements have been enabled within the collaborative business process:

- Forward visibility
- Intelligent exception identification and resolution
- Rapid replanning based on intelligent exceptions
- High value optimizations

The actual value of Demand Collaboration manifests itself in the form of reduced stock outs, reduced safety stock, reduced obsolescence, improved cycle times, improved throughput and improved return on investment. Conservative estimates of potential value generated by RHYTHM Collaboration Planner at a company ranges from tens of millions of dollars to hundreds of millions of dollars.

RHYTHM®

RHYTHM Carrier Bid Optimizer™ empowers a shipper's logistics managers to collaborate with carriers to eliminate mutual transportation costs. Whereas earlier forays into supply chain management produced savings for one company at the expense of its trading partners, RHYTHM Carrier Bid Optimizer creates a sustainable trading relationship in which all partners benefit. RHYTHM Carrier Bid Optimizer essentially overlays the carrier's transportation network atop that of the shipper whose business is being bid upon and then subsequently identifies synergies that can be passed on in the form of competitive pricing bundles.

Current Business Environment

Even though transportation is acknowledged as an important supply chain constraint for many companies, the term "transportation optimization" has traditionally only considered savings opportunities after carrier rates have been negotiated. Whereas companies were once forced to operate in a less-than-optimal business situation, today's leading enterprises sculpt their own operational landscapes. Because RHYTHM Carrier Bid Optimizer pushes the transportation optimization process upstream into longer-term planning, a globally feasible awarding plan is achieved.

Business Drivers

Transportation optimization tools that perform rating and routing can only yield semi-optimal results, because they are operating with rates that are higher than they need to be. Optimization improves once these rates are lowered by the carriers. But how do carriers accurately calculate how much they can lower the cost during bidding if they do not simultaneously factor backhaul probabilities and asset utilization costs?

The answer is that they can't. Historically, carriers were uncertain of their costs while bidding, as the effects of winning new business was determined after the fact, in response to the bids they won. RHYTHM Carrier Bid Optimizer enables carriers to determine their costs associated with winning a set of bids while the bid is being placed, thus enabling carriers to understand how low they could bid and enabling the shipper to optimize routing and rating with lower priced rates.

i2 Technologies delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

CARRIER
bid optimizer

i2
INTELLIGENT eBUSINESS SOLUTIONS

Why Current Solutions Fail

Other solutions on the market fall short of the value that RHYTHM Carrier Bid Optimizer offers because they:

- Were designed to benefit either a carrier or a shipper—but not both

- Do not offer tools to assist both sides during the procurement process

- Are not part of an integrated approach to transportation planning

- Do not increase load acceptance rates through flexible demand tier pricing

What is RHYTHM Carrier Bid Optimizer?

RHYTHM Carrier Bid Optimizer is a strategic decision support tool intended for periodic use in support of transportation contract negotiations. Both shippers and carriers attain advantages through collaborative consideration of service requirements, carrier capacities and total network costs. Shippers analyze, forecast and format their transportation purchasing needs into a well-defined set of requirements. Carriers then perform additional analyses of the shipper's requirements and selectively price bids according to their efficiencies within both the shipper's and carrier's combined network. The result is the best possible use of transportation resources. It is the bundling of lanes in bids that provides opportunities for cost savings, as RHYTHM Carrier Bid Optimizer is a procurement process and not just a software tool.

The RHYTHM® Advantage

RHYTHM Carrier Bid Optimizer is an important supply chain solution that provides the optimal rates by which the RHYTHM Logistics Integrated Solution can perform its optimization. Transportation resources are used in ways that maximize customer service, while minimizing total delivered costs.

The Carrier Bid Optimizer process steps further into the world of real-time bid optimization, as shippers and carriers are brought together into a transportation exchange environment. This Internet-enabled forum allows carriers to bid on available shipments with respect to service and equipment requirements. A bid optimization occurs and the selected shipments or loads are awarded on an individual real-time basis. The same benefits that are inherent in the Carrier Bid Optimizer process are incorporated into this exchange services network—in real-time, as opposed to long term.

Key Benefits

RHYTHM Carrier Bid Optimizer has produced an 8 percent to 12 percent reduction in overall transportation expenses, and it can begin generating a return on investment 90 days to 150 days after implementing the software. In addition to providing rapid ROI with cost savings, RHYTHM Carrier Bid Optimizer increases the shipper's load acceptance rate through demand tier pricing, which allows carriers to submit bids whose price reflects demand fluctuations associated with seasonality adjustments.

Delivering Value

i2's intelligent business process optimization solutions have already generated significant customer value. By focusing on the key business drivers within a supply chain, i2's software enables companies to improve customer service, profitability, return on assets and competitive position. On average, i2's customers see quantifiable business benefits within three to six months of implementation, with full payback achieved within a year.

DS-1042 (10/99)

RHYTHM®

Account management is an essential business function for many companies, especially for those in fast-moving consumer product industries. A major component of account management is trade promotion management. Large amounts of money, often from 10 percent to 15 percent of a manufacturer's revenue, are funneled into the retail channel to drive short-term volume using trade promotions. In most cases, this investment provides little in return; most promotions are unprofitable from a manufacturer's perspective.

Introduction

One of the most significant phenomenon in the packaged goods industry has been the increase in the reliance on trade promotions and a shift from consumer promotions and advertising. Retailers have grown significantly in power. They demand increasingly superior customer service and preferential treatment. Significant investments in trade promotions are made with the hope of generating growth and visibility in retail storefronts. Sales and marketing managers spend 20 percent to 30 percent of their time designing, implementing and overseeing these promotions.

During the account management process, the strategic allocation of resources to drive revenue and market share is performed. During this process, allocations of millions of dollars are committed to drive incremental business through retail channels. Within the consumer packaged goods industry, it is estimated that manufacturers spend 10 percent to 15 percent of revenue on trade promotions alone, with marginal insight into the effectiveness of this spending.

i2 Technologies delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

ACCOUNT planner

i2

Current Business Environment

In most organizations, trade promotion decision making is not supported with intelligent tools, which leads to:

- Suboptimal allocation of strategic resources
- Ineffective planning and spending at the customer level
- No visibility or linkage to supply chain, leading to low levels of customer service
- No linkage among account planning, store level execution and financial systems, leading to difficult reconciliation processes

These issues are compounded by the fact that many organizations are structured as functional silos with no linkages or visibility within and between functional areas. For example, many sales organizations have no systematic way of rolling up planned spending and incremental volume across different products and geographies. Consequently, companies are now realizing that the cost of running most trade promotions significantly outweighs the benefits.

What is RHYTHM Account Planner?

RHYTHM Account Planner™ is a comprehensive and integrated software solution designed to support optimal decision-making during the account management process. Using i2's advanced technology and integrating key processes in the enterprise, this solution maximizes the velocity, throughput and productivity of account planning processes. RHYTHM Account Planner is the only solution available that uses advanced planning and optimization tools to address the entire cycle—from resource allocation, to planning, to linking execution systems and the supply chain and finally, monitoring and tracking—making it the most complete, integrated and effective account planning solution available.

The RHYTHM® Advantage

i2 Technologies provides a complete and integrated solution to support the complete account management process. RHYTHM Account Planner is unique because it seamlessly integrates the account planning process with demand planning, supply chain management, financial systems, operational systems and store level execution processes.

Key Benefits

RHYTHM Account Planner provides the following benefits to organizations:

- Optimizes trade promotion spending by simulating multiple courses of action and allocating resources intelligently
- Increases the velocity of the organization by allowing rapid replan capabilities in response to changing market and competitive conditions
- Provides visibility of account plans to the supply chain and execution systems, improving customer service levels

Delivering Value

Providing visibility of the financial impact of account-level decisions can derive significant value. By linking the account plans to back-office operations such as demand and supply chain planning, the value proposition can be greatly increased. To unlock the most value in account planning improvement programs, the RHYTHM solution addresses both account level planning needs and back-office efficiencies.

DS-6195 (10/99)

RHYTHM Inventory Planner™ helps users manage inventory efficiently and effectively. Users can formalize their inventory controls and analyze safety stock in terms of the variability due to demand, process and supply. The solution's simulation capability allows users to foresee the effects of changing market conditions, technology, management policies, product line and supply chain structure on inventory investment and customer service.

Typically, supply chains contain thousands of items, as well as numerous stock keeping units (SKUs). At the same time, several business units or departments within the organization are stakeholders in the inventory planning and management process. RHYTHM Inventory Planner addresses the inventory planning needs of different departments and the entire organizational hierarchy with easy-to-use tools and reports that provide analysis at different levels of abstraction.

Current Business Environment

Supply chains are subject to variability on two fronts. On the demand side, forecasted volumes and mix could change appreciably, while yield losses, machine downtimes, production quality problems, or unreliability in transportation networks could cause supply chain variability. Safety stocks are carried so that customer service levels are not compromised in the face of these kinds of variabilities.

With rapid changes in technology, the marketplace, and product line, the key to a business' success is to consistently anticipate, not simply react to market demand. The inventory planning process provides management with the ability to strategically direct its businesses to achieve competitive advantage on a continuous basis by putting the right product in the right place at the right time, subsequently maximizing return on assets.

Why Current Solutions Fail

Inventory planning and management play a key role in successful supply chain management. While informal inventory controls (based on experience and judgment of planners) might be sufficient for industries whose environment remains stable, they are inefficient for industries whose environment changes rapidly. Typically, informal inventory controls either result in insufficient inventory, causing a decrease in revenue

i2 delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process— from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

INVENTORY
planner

i2

INTELLIGENT eBUSINESS SOLUTIONS

(loss of sales, long order backlogs and poor customer satisfaction) or surplus inventory, causing additional expense (inventory carrying cost and cost of depreciation of that inventory). RHYTHM®'s formal inventory controls provide systematic ways to compute safety stocks and predict inventory positions by considering all business objectives. The result is an optimal inventory plan that maximizes customer service performance while minimizing inventory investment.

What is RHYTHM Inventory Planner?

RHYTHM Inventory Planner offers a complete inventory planning solution that addresses the tactical and strategic planning needs of make-to-stock, make-to-order and configure-to-order users. The RHYTHM workbench provides an intuitive workflow that captures all the steps required to perform inventory planning activities, including data analysis, ABC classification, safety stock computation, tactical and strategic inventory planning and exchange curve analysis.

The RHYTHM Advantage

RHYTHM Inventory Planner offers tactical inventory planning, which determines exactly how much safety stock to carry at a given point in the supply chain. It provides predefined formulas for computing safety stock in terms of quantity or time of coverage, and also allows analysis due to demand- or supply-only variability, which helps identify issues involving supply performance or sales forecasting. Users can also interactively bias the result of the predefined formulas or override them with their own. This flexibility allows for hybrid inventory controls that rely both on practical and theoretical approaches.

RHYTHM's ABC classification allows users to classify similar items into multi-level group hierarchies and apply inventory controls, such as replenishment schedule and fill rate, to all items in the group. Users can change the item mix of a group in real time by interactively modifying filter expressions based on any number of item attributes. Additionally, users can import existing groups. Different departments can classify the same set of items in different ways. Flexible and easy-to-use item classification, along with comprehensive data analysis, allow exploration of extensive "what-if" scenarios.

In addition, RHYTHM offers a strategic buffer management module which addresses such issues as: impact on cost, degrees of flexibility and levels of responsiveness by recommending not only how much safety stock to carry, but also where in the supply chain to carry it. Its advanced algorithms optimize customer service performance, as well as weighing the impact of carrying inventory at each location. It is scalable from single-site to multiple-enterprise supply chain networks. Strategic buffer management, coupled with advanced supply chain operational and execution planning, places the right item in the right location at the right time, maximizing return on assets.

Key Benefits

RHYTHM Inventory Planner provides the following key benefits over traditional methods of inventory planning:

- Flexibility in classifying inventory
- Automatic as well as manual generation and management of safety stock
- Speed in the form of the memory-resident inventory planning engine
- Tight integration of inventory planning information with advanced planning engines
- A formal framework for "what-if" scenarios, which enable planners to quickly see how changes in demand rates, lead times or costs affect future investment in inventories and customer service performance

Delivering Value

i2's intelligent eBusiness solutions have already generated significant customer value. By focusing on the key business drivers within a supply chain, i2's solutions enable companies to improve customer service, profitability, return on assets and competitive position. On average, i2 customers realize quantifiable business benefits within three to six months of implementation, with full payback achieved within a year.

DS-903 (02/00)

RHYTHM®

RHYTHM Production Scheduler™ is a scheduling solution that uses complex and powerful genetic algorithms. It generates schedules that reflect goals specific to a particular customer.

Current Business Environment

RHYTHM Production Scheduler masters manufacturing environments with such complex business rules as changeover transition times and routing requirements, which affect a schedule's feasibility and fitness. The solution is designed for single or multi-stage environments, including environments with a choice of multiple resources in each stage. Manufacturing processes can be either batch or continuous processes, or both. The environment may include work-in-process (WIP) storage buffers that have finite capacities, such as tanks, silos, hoppers and bins. RHYTHM Production Scheduler supports environments that create multiple finished products (SKUs) that differ only in packaging materials or labels.

RHYTHM Production Scheduler is appropriate for a variety of manufacturing industries, including consumer goods and retail, stamping plants, transmission lines, automotive, pharmaceuticals, chemical, oil and gas.

Business Drivers

As the marketplace becomes more dynamic, manufacturers are providing more options and requiring more flexible shop floors. Because of tighter supply chains and more limited resources, manufacturers must be more productive. Traditional methods for generating schedules, which are typically partly or completely manual, must be replaced by improved techniques that can create feasible and cost-effective schedules.

Why Current Solutions Fail

Traditional techniques do not result in schedules that are globally optimal or cost-effective. They usually involve a management tool, such as a spreadsheet, and a manual process that relies on "rules of thumb." Such techniques are cumbersome and make it difficult to react to breakdowns and emergency orders.

i2 delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

PRODUCTION scheduler

i2®
INTELLIGENT eBUSINESS SOLUTIONS

What is RHYTHM Production Scheduler?

RHYTHM Production Scheduler consists of an interactive graphical user interface (GUI) and an optimization engine. The optimization engine is based on RHYTHM Optimal Scheduler Development Environment; it includes a genetic algorithm and schedule builder, plus a constraint computation engine.

RHYTHM Production Scheduler can perform the following tasks:

- Import and model data as needed for specific business requirements and rules
- Generate high-quality schedules quickly
- Solve large-scale problems that involve complex rules, constraints and data
- Rapidly check schedules for feasibility and desirability
- Perform "what-if" planning by viewing instantaneous feedback about hypothetical changes

The RHYTHM® Advantage

RHYTHM Production Scheduler is part of i2's solutions for Supply Chain Management. RHYTHM Production Scheduler interacts with i2 planning tools, such as RHYTHM Supply Chain Planner™, RHYTHM Factory Planner™ and RHYTHM Production Planner™, as follows:

- The planning tool determines bucketed demands, which are usually daily or weekly, for each plant in the supply chain—based on approximate production constraints.
- Next, RHYTHM Production Scheduler, which is implemented at each plant, receives the demands for that plant and schedules production on a detailed level to satisfy as many demands as possible. Because RHYTHM Production Scheduler is implemented at each plant, each plant's model can be built and customized for that particular production environment.
- The resulting schedule may be sent back to the planning tool to update anticipated receipts.

In addition to integration with other i2 products, RHYTHM Production Scheduler may be integrated with external enterprise resource planning and legacy systems through industry-standard technologies including Java, Common Data Model (CDM) and CORBA.

Key Benefits

The following RHYTHM Production Scheduler characteristics are some of its most important benefits:

- **Speed.** RHYTHM Production Scheduler generates good schedules quickly—in minutes—and excellent schedules after further iterations.
- **Optimization.** The genetic algorithm embedded in RHYTHM Production Scheduler has been tailored for solving practical scheduling applications. It finds desirable solutions to large problems that have complex constraints.
- **Interactivity.** RHYTHM Production Scheduler GUI is easy to use and helps users understand at a glance how constraints affect the current schedule. The GUI also supports reactive rescheduling when problems occur on a resource or a new order is received.

Delivering Value

RHYTHM Production Scheduler provides the customer with a schedule that reduces expenses associated with the manufacturing process and increases revenue associated with higher throughput and customer service. Specifically, RHYTHM Production Scheduler adds value by:

- Minimizing changeover/setup time
- Minimizing WIP
- Improving due-date performance and on-time production
- Improving production throughput with existing equipment
- Reducing scheduling cycle time
- Improving the ability to react to emergencies and special opportunities, such as satisfying hot orders
- Supporting demand prioritization

global VMI

RHYTHM Global VMI (Vendor Managed Inventory) provides support of current VMI strategies utilized by trading partners, including Electronic Data Interchange (EDI). Additionally, RHYTHM Global VMI extends traditional VMI to include multiple trading partners and provides the first constraint-based, collaborative VMI solution.

There are a number of reasons for supply chain partners to establish VMI partnerships. The procurement partner has the following goals:

- *Improve the service level to stores*

- *Improve warehouse inventory turns (especially beneficial for date-sensitive products)*

- *Eliminate buying positions or allow buyers to spend more time in category analysis and less time re-ordering*

The supplier partner has the following goals:

- *Increase sales by reducing stock-outs (1-4% is common)*

- *Level out demand by matching market demand with supply*

- *Improve relations with the procurement partners, leading to more frequent promotions, greater acceptance of new products and additional shelf space for existing products, all leading to increased sales*

- *Improve forecast of consumer demand and allocation of resources to meet that demand*

The strategic advantage of RHYTHM Global VMI customers is the development of truly feasible, integrated VMI strategies which can assure improved fill rates for the minimum investment in inventory while avoiding stockout conditions.

an integrated view of the enterprise

One of the shortcomings of traditional solutions to VMI is that these relationships have shifted the responsibility and resource burden of launching orders to the supplier. Overall, there has been minimal net improvement in inventory levels across supply chains or end customer stockouts. This is the most significant reason why VMI has proved to be unprofitable for most manufacturers who have chosen to implement this alternative.

i2 Technologies

global VMI *continued*

In most cases, suppliers have justified the higher operating costs of VMI through improved relationships with their customers and the expectation that this will lead to greater marketshare. However, integration of accurate and timely demand signals into the suppliers' systems is required to take advantage of the enhanced visibility provided by VMI. This undoubtedly can lead to significantly better intermediate term plans. However, VMI in its current form is not capable of providing this solution and hence, does little to improve customer service and reduce inventories. Instead, it allows the procurement partner to shift costs to the supplier partners.

Suppliers could use the data which customers use if they integrate it into their supply chain planning efforts. RHYTHM Global VMI is designed to take full advantage of all of the data provided by the VMI customer and to deal with any kind of customer, VMI or not, within a single planning framework.

the RHYTHM advantage

In RHYTHM Global VMI, you can represent, individually, all of your customers and suppliers in a single, comprehensive supply chain structure. This gives you the power to integrate VMI customers into your operating plans and generate an optimized solution across your entire supply chain. As a result, RHYTHM can show you how to meet the performance goals of VMI customers at the lowest possible cost while continuing to provide excellent service to your customers. By integrating these operations into a single plan, you can escape the redundancies of coordinating multiple, independent planning environments for VMI or setting aside inventory for VMI customers.

leading edge technology

As a part of the RHYTHM Global Decision Support Architecture (GDSA), Rhythm Global VMI shares data between trading partners from all the planning systems in the enterprise, plus it can be quickly and easily integrated with Enterprise Resource Management systems from vendors such as SAP, Oracle, J.D. Edwards and SSA. The integration is accomplished via utilization of industry standard technologies such as Java, DCOM, CORBA, etc. Additionally, RHYTHM Global VMI is designed to fully interoperate over both private and public networks. In the private value-added network space, EDI data formats will be supported. Standard communication protocols for TCP/IP network environments which include the Internet will be supported as well.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter-and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

The Intelligent Solution.

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas   75039   USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   *net* www.i2.com

RHYTHM Service Scheduler™ is a decision-support tool for intelligent scheduling of service calls to ensure that enterprises can cost-effectively provide their customers with reliable, timely service. RHYTHM Service Scheduler can be used either to schedule repair crews which use a standard inventory of parts, or concurrently schedule crews and material that is not on site and needs to be available at the time of repair. RHYTHM Service Scheduler handles the logistics issues for these situations and generates an optimal (capacity-feasible, minimum travel time) solution.

Current Business Environment

As price and product differentiation become less effective sources of competitive advantage, maintaining long-term, profitable customer relationships has become the primary competitive differentiator. Effective customer care significantly improves long-term customer satisfaction and retention. Field service is a key component of customer care in many service-intensive industries. Current solutions for service scheduling vary from chalkboards to complex software programs. However, these work in isolation from the customer interface, service staff, parts planning and manufacturing organizations.

Business Drivers

Field service providers have to provide first-time successful fixes within tight, contractually obligated deadlines. Service requirements can be highly variable and volumes can be very high. Service is especially important in industries in which expensive capital assets cannot be down without significantly impacting business performance. Service scheduling solutions need to seamlessly couple the customer interface with back-end supply chain processes, and provide superior customer service in a dependable, timely and cost-effective manner.

Why Current Solutions Fail

Current approaches to service scheduling are point solutions that rely upon disparate technologies and data sources. They fail to simultaneously meet multiple requirements: mitigating the impact of customer downtime, maximizing efficiency of the field personnel, optimizing facility usage and minimizing parts inventory costs and lead times. Consequently,

i2 Technologies delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

SERVICE scheduler

the losses due to extended equipment downtime, overabundance of parts inventories and inefficient use of personnel and equipment are staggering.

What is RHYTHM Service Scheduler?

RHYTHM Service Scheduler develops service schedules for service-intensive organizations. It considers a wide range of constraints to determine an optimal service schedule:

- The skill set and estimated time duration needed for the performance of the service call

- Customer location (travel time, shortest path, local routing information)

- Contract type (e.g., 2 hour, 4 hour, X-day service guarantee, etc.)

- Field Engineer (FE) availability and preference; the customer might prefer a particular FE or a FE knows about the customer environment and should be the first choice

- Availability of parts and tools needed to fix the problem. Is the part already at the location? Is the part with the FE? Is it best for the FE to pick the part from its nearest distribution center or should it be shipped independently?

- Business rules (labor policies, FE seniority, overtime, and maximum travel time without a break)

- Required maintenance schedules

Based on these, RHYTHM Service Scheduler determines when and which FE can provide the required service and whether the parts required should be independently dispatched or need to be picked up from a distribution center by the FE.

RHYTHM Service Scheduler can also be used for strategic planning purposes. Based on the forecasted levels of different types of service calls, the right number of field service engineers with the right skills at the right time can be determined using RHYTHM Service Scheduler. This plan can be used to guide the hiring and training of field service engineers.

The RHYTHM® Advantage

RHYTHM Service Scheduler is part of i2's RHYTHM Customer Management suite and provides the only end-to-end, customer-focused service scheduling solution. Unlike traditional functional silos (order taking, processing and scheduling), RHYTHM Service Scheduler provides real-time integrated information with forward visibility into the back-end planning functions—thereby ensuring that only feasible promises are made to customers.

RHYTHM Service Scheduler does global optimization simultaneously across all the constraints and business rules in a single pass, rather than optimizing over multiple passes. This ensures the most efficient use of available resources, while meeting high service level expectations.

Other RHYTHM Service Scheduler differentiators include an intelligent, user-friendly, graphical user interface (GUI) which provides quick visibility into the status of the entire service operation allowing rapid reactions to changes, readily highlighting problem details, easily adding new business rules and effortlessly analyzing "what-if" alternative schedules—all without any coding knowledge being required.

Key Benefits

- Greater customer satisfaction due to increased first-time fix rate

- Increase in service contracts met on time

- Better utilization of resources (service personnel and repair equipment)—lower costs, greater number of service calls, elimination of multiple visits—due to reduced idle/travel time, better parts availability and lowered managerial and operational expenses

Delivering Value

i2's intelligent eBusiness solutions have already generated significant customer value. On average, i2 customers realize quantifiable business benefits within three to six months of implementation, with full payback achieved within a year.

sequencer

RHYTHM Sequencer is a powerful software solution for scheduling assembly lines and other sequential production facilities. It optimizes the sequence of orders through manufacturing operations to increase throughput, to balance workloads and to achieve other optimization goals. RHYTHM Sequencer helps manufacturers reliably operate at peak performance.

Improperly sequenced manufacturing operations can lead to poor throughput, inaccurate schedules and partially finished assemblies waiting for delivery of missing parts. Orders can back up. Due dates may be missed. In contrast, RHYTHM Sequencer generates schedules that respect all manufacturing constraints and optimally sequences orders. Throughput is improved, as well as schedule accuracy and on-time delivery. In addition, feeder lines and the availability of key components are considered in building the schedule, so rework due to missing parts is virtually eliminated.

an integrated view of the enterprise

Rather than "pushing" orders through the plant, RHYTHM Sequencer allows manufacturers to build an enterprise-wide "pull-through" manufacturing environment based on actual orders. RHYTHM Sequencer can schedule finished goods production based on actual orders, component availability and logistics constraints. A pull-based workflow can be created back through feeder lines, component plants and suppliers. The result is a tightly synchronized supply chain driven by production orders.

RHYTHM Sequencer also helps manufacturers address the growing need for manufacturing flexibility and faster responsiveness. With the trend towards mass customization, companies are building a wider variety of products, often with their existing facilities. RHYTHM Sequencer gives manufacturers the ability to build more models and product variations utilizing the same plant and equipment. With RHYTHM Sequencer, manufacturers can optimize complex product mixes or even build high volume, one-of-a-kind production.

i2 Technologies

sequencer *continued*

the Rhythm advantage

As part of the RHYTHM product suite, RHYTHM Sequencer works with the other RHYTHM products to integrate manufacturing with distribution, transportation and other parts of the supply chain. RHYTHM Sequencer optimizes manufacturing operations as part of a global supply chain solution.

RHYTHM Sequencer was specifically designed for assembly lines and discrete flow shops. By focusing on problems with simple routings, uni-directional flows and slot-based timing, RHYTHM Sequencer offers a powerful solution for this specific scheduling problem. As a result, RHYTHM Sequencer is completely configurable. Entire solutions can be implemented with little or no programming, reducing delivery time and implementation cost. The elimination of programming also allows RHYTHM Sequencer to be configured by domain experts and third parties.

leading edge technology

RHYTHM Sequencer optimizes production based on a complete range of configurable supply chain constraints covering the assembly line, upstream feeder plants and downstream shipping operations. Typical constraints include labor content, model sequencing and spacing, equipment capacities, shipping load optimization, material availability, marketing priorities and logistics requirements. Users can define both strong constraints (cannot violate) and weak constraints (scheduling preferences). RHYTHM Sequencer employs genetic algorithms and expert system-based constraint computation to ensure global optimization. It creates not only *feasible* schedules, but *optimized* schedules.

RHYTHM Sequencer also employs an interactive, intelligent, graphic user interface with instant constraint checking. It enables the user to interactively perform drag and drop, "what-if" analyses on the optimized schedule, instantly displaying constraint violations and explaining them in a nearby window. Manual schedule editing can include a range of operations such as shifting, compressing, freezing, pinning and unscheduling.

As part of the RHYTHM Global Decision Support Architecture (GDSA), RHYTHM Sequencer shares data between trading partners and between all the planning tools in the enterprise. It can also be quickly and easily integrated with Enterprise Resource Management systems from vendors such as SAP, Oracle, J.D. Edwards and SSA.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter-and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i
i2 Technologies
The Intelligent Solution.

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas   75039   USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   *net* www.i2.com

reporting

In today's business environment, the ability to effectively compete is increasingly dependent upon a company's ability to recognize and take advantage of new opportunities as well as react to competitive and market pressures. This type of responsiveness requires immediate access to relevant information presented in a manner that is both flexible and conducive to extensive interrogation. On-line analytical processing (OLAP) approaches and applications based on these platforms are rapidly becoming essential weapons in an environment where information and its effective use can determine success or failure.

RHYTHM Reporting enables users to analyze dimensional (e.g. time, account region, channel, product, resources, customers, etc.) slices of data at a level of detail that supports intelligent decision-making. Central to realizing benefit from an OLAP reporting tool is the ability to "feed" the OLAP engine by collecting data from RHYTHM advanced planning and optimization engines. Additionally, data can be gathered from relational databases, data warehouses, legacy systems, spreadsheets and others. This broad range of data in combination with powerful on-line analytical capabilities, complex modeling and calculation features allows organizations to leverage these data sources to make better informed and faster decisions.

the RHYTHM advantage

RHYTHM Reporting leverages i2 Technologies' leading supply chain planning solutions through the RHYTHM Global Decision Support Architecture to deliver unparalleled power and responsiveness. By providing users with access to information gathered and optimized across multi-enterprise supply chains utilizing diverse applications and data sources, in addition to detailed support data, RHYTHM Reporting goes beyond mere analysis and empowers focused decision-making.

For example, assume that planned optimization of a company's global supply chain reveals that due to a shortage of transportation resources, there will be insufficient product to support a nationwide promotion. A quick decision must be made either to postpone the promotion or simply suffer the projected shortages and customer dissatisfaction. Analyses using RHYTHM Reporting may reveal that other adjustments could be made to bring demand and supply into balance and preserve the promotion. This type of ad-hoc analysis can only be performed using a sophisticated OLAP tool which can access data across the supply chain in one reporting structure. This is the strength of RHYTHM Reporting.

i2 Technologies

reporting continued

In addition to this type of fast analysis of planning information, RHYTHM Reporting also provides the ideal way to access information from prior plans, compare them against each other and to the actual results of operations. For example, using RHYTHM Reporting, data can be accessed across the supply chain and analyzed to compare actual resource utilization with planned utilization of resources. Similar analyses can be used to determine the profitability of the plan and the success of the current plan compared to previous plans.

RHYTHM Reporting is available with an assortment of standard reports defined for use with the RHYTHM family of supply chain planning products. These reports include analysis of demand and supply, resource utilization, activity-based costing, the effects of engineering changes on costs, resource loading, sales volumes, expenses, service levels, production and others.

leading edge technology

RHYTHM Reporting combines the leading technologies in planning and optimization from i2 Technologies with data warehousing and OLAP technology from Arbor Software. This combination provides the speed and flexibility you need to manage the ever-changing needs of your business.

As a part of the RHYTHM Global Decision Support Architecture (GDSA), RHYTHM Reporting presents data from all the planning systems in the enterprise, plus it can be quickly and easily integrated with Enterprise Resource Management systems from vendors such as SAP, Oracle Manufacturing, J.D. Edwards and SSA, as well as legacy systems.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter-and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

The Intelligent Solution.

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas   75039   USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   *net* www.i2.com

ARBOR®
SOFTWARE

RHYTHM®

RHYTHM provides intelligent decision-support to plan and optimize inter- and intra-enterprise supply chains.

- advanced scheduling
- demand planning
- distribution planning
- manufacturing planning
- master planning
- order promising
- transportation planning

i2 Technologies

The Intelligent Solution.

order promising

In today's global marketplace, companies are under tremendous pressure to increase service levels while lowering costs—despite the fact that increasing product variability and volatility make this challenge even more difficult. To effectively compete, enterprises need to make accurate delivery promises and be able to meet them. Often, it is the lack of detailed visibility into supply chain operations that prevents companies from quoting accurate dates and meeting customer orders on time. RHYTHM's Order Promising solution improves customer service levels and profitability by enabling companies to confidently make delivery promises to their customers. It does so by providing visibility into the complete demand/fulfillment cycle from the sourcing and procurement of raw materials through manufacturing, transportation, and distribution to customers.

how does RHYTHM fit your specific business needs?

Today's need for sophisticated order promising capabilities have evolved far beyond the traditional definition of ATP (available-to-promise). Since enterprises employ diverse approaches to how they determine and promise orders to customers, the RHYTHM Order Promising solution can be deployed in many different ways to support the unique requirements of the business. This level of flexibility offered by RHYTHM is far superior to competitive solutions that require the business to conform to a single, specific ATP strategy supported by the solution provider. To make a significant impact on customer service levels, companies require different order promising strategies based upon the operational characteristics of the enterprise supply chain, business unit, product family or SKU level, or specific customer needs. The speed and flexibility of RHYTHM's Order Promising solution is a reflection of the powerful modeling capabilities supported by the underlying object architecture.

how does RHYTHM support your global sales organization?

When used as a global ATP server, RHYTHM is a powerful tool that enables the sales organization to have global visibility into the availability of inventory across the supply chain and to work with real-time, accurate information. In this scenario, RHYTHM interfaces to large-scale ERP order management systems to provide accurate quotes in sub-seconds, the RHYTHM server then runs continuously to support a global sales organization that can access the ATP server 24 hours a day, 7 days a week. Because of its memory-resident architecture, it can efficiently process more than 100 requests per second.

key capabilities of RHYTHM order promising

knowing what your supply chain can actually deliver

Traditional ATP mechanisms are ineffective because they often rely on estimates to produce delivery date quotations and generally, only support a material-based manufacturing strategy. RHYTHM, on the other hand, generates a constraint-driven plan that simultaneously accounts for demand, material, and capacity, and continually adjusts the plan based on the changing dynamics of the supply chain. Because it considers all the dynamic elements that determine the actual total lead time, it results in an accurate, constraint-based plan that forms the basis to quote reliable promise dates.

increased control over how customer demands are satisfied

RHYTHM can model complex sales organizations including channels, geographic regions, pricing categories, or any sales entity in detail to provide significant control over the demand fulfillment process. Each of these entities can forecast demand, commit to orders, set customer priorities, and manage allocations for all of the products under its domain of control. Since RHYTHM also models the entire hierarchical span of control, a sales entity can also manage the usage of allocations by its subordinate members using complex rules such as first-come first-serve, prioritized allocation, fair share, or any business rule specific to an industry. This flexibility of allocation techniques allows companies to significantly improve customer service levels and profitability.

visibility of product availability worldwide

RHYTHM continuously monitors consumption of orders against allocation. Thus, at any given time, it provides complete visibility of ATP quantities of finished goods and component inventory across all distribution centers and manufacturing plants worldwide. The global sales organization can have visibility to this global ATP whose granularity can be daily or as real-time as needed (or supported by the ERP infrastructure). With this capability, sales organizations can intelligently manage fluctuations or mismatches in demand and supply by moving available inventory from alternate sources other than their designated distribution centers or plants, in order to satisfy the customer order quantity and due date.

an extensive modeling environment that offers true flexibility

Because RHYTHM represents ATP at the component level, it can promise from both end-item availability and component availability when quoting due dates (commonly referred to as Capable-To-Promise). Additionally, RHYTHM's ability to implement source rules, i.e., entire order on time, partial delivery of order on time, all line items as early as possible in one delivery, and other variations, allows companies to model and implement their business rules more effectively.

delivery date monitoring

Once delivery date promises have been made, it is still necessary to monitor these dates throughout the production and logistics time frame to determine if unexpected events have occurred that will affect the delivery date promise. RHYTHM's delivery date monitoring capabilities include monitoring and managing increased and decreased availability, and reassigning allocations based on demand patterns.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter- and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor, and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

The Intelligent Solution

909 E. Las Colinas Blvd., 16th Floor
Irving, Texas 75039 USA
tel 214-860-6000; 800-800-3288
fax 214-860-6060
e-mail info@i2.com net www.i2.com

RHYTHM®

RHYTHM provides intelligent decision-support to plan and optimize inter- and intra-enterprise supply chains.

- advanced scheduling
- demand planning
- distribution planning
- manufacturing planning
- master planning
- order promising
- transportation planning

i2 Technologies

The Intelligent Solution.

manufacturing planning

i2 Technologies' solution for manufacturing planning takes a global approach to intelligently optimize the performance of a manufacturing operation. By analyzing what is best for the manufacturing organization or supply chain as a whole, RHYTHM simultaneously manages multiple and dynamic constraints to develop a feasible operating plan for plants, departments, work cells, or production lines. The resulting plans meet the customer's delivery requirements and business objectives.

how does RHYTHM solve complex planning problems?

RHYTHM manages complex manufacturing operations that involve large numbers of resources and operational steps in real time, as well as solves common planning problems found in factories, such as managing complex bills of material, alternate routings, and optimizing machine setup sequences. This produces an intelligent and feasible production plan along with the associated set of manufacturing and purchasing recommendations. The RHYTHM Manufacturing Planning solution can be used in conjunction with Advanced Scheduling to determine the optimal sequence of operations at each resource.

how does RHYTHM support business objectives?

With its global visibility and constraint management capabilities, RHYTHM creates feasible plans that reflect real-world manufacturing conditions in order to meet manufacturing goals such as improving due-date performance, cutting lead times, improving throughput, and reducing inventory and operating expenses.

how does RHYTHM differ from MRP in deriving a feasible plan?

Traditional MRPII (Manufacturing Resource Planning) logic uses a sequential approach to derive a plan. First, a Master Production Schedule (MPS) is created, which provides the basis for Material Requirements Planning (MRP), and, after this step, attempts to perform Capacity Requirements Planning (CRP). Unfortunately, this approach considers material and capacity as independent variables at each stage that results in an infeasible plan. To resolve this, MRP's logic advocates iterating this sequence multiple times to adjust for changes made at each step. Because RHYTHM simultaneously considers all constraints —material, capacity, operators, tools, etc.—it generates a feasible operating plan in a single pass. The entire plan is generated in a fraction of the time since RHYTHM computes the plan in memory.

key capabilities of RHYTHM manufacturing planning

problem-oriented planning that enables immediate resolution

From the Problem Window, RHYTHM enables planners to instantly "drill-down" into the details of a problem by using "point-and-click" actions, allowing planners to resolve the problem by expediting material, adding capacity by running additional shifts, or other available options. This capability goes beyond simple exception-based reporting which only identifies problems, but cannot resolve them.

comprehensive support for both finite and infinite capacity planning

Infinite capacity planning is an important step in formulating an optimal, finite capacity plan. Initially, RHYTHM creates a plan that considers finite materials, but infinite capacity to illustrate the ideal level of resource capacity needed to meet customer demand. In infinite capacity planning mode, RHYTHM flags the overloaded resources, allowing the user to take corrective actions to meet the delivery date. However, the user also has the choice of using RHYTHM's constraint-based, load-balancing algorithms to automatically create an optimal finite capacity constrained plan.

accurate real-time due-date quoting capability improves customer service

RHYTHM's memory-resident planning engine is extremely fast where plans are generated in minutes compared to hours in traditional MRP systems that use database-driven engines. Its architecture supports a highly flexible modeling environment that allows users to model their manufacturing operations at a detailed level. RHYTHM can be integrated with order management systems where customer service representatives can confidently quote accurate delivery dates in seconds or determine the status of a customer order in real-time, based upon current production and inventory status.

configurable to fit multiple environments

RHYTHM Manufacturing Planning solutions support assemble-to-order, configure-to-order, make-to-order, make-to-forecast, build-to-stock, and hybrid environments. They also support discrete, batch-process, and rate-based environments in all major industries including metals, high tech, automotive, consumer packaged goods, industrial products, pharmaceuticals, and aerospace and defense industries.

tight integration with existing systems

Using RhythmLink™, i2 Technologies' integration tool, RHYTHM can be integrated with MRP, ERP, and transactional databases. Whether the enterprise has made an investment in a client-server ERP system or is using legacy systems, RhythmLink provides quick and effective integration. Further, through real-time interfaces to MRP and ERP systems from SAP™, Oracle, and SSA, RHYTHM uses the data maintained on these transaction systems to provide advanced planning and optimization capabilities.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of intra-enterprise and inter-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including automotive, apparel, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor, and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

The Intelligent Solution

909 E. Las Colinas Blvd. 16th floor
Irving, Texas 75039 USA
tel 214-860-6000 800-800-3288
fax 214-860-6060
e-mail info@i2.com *net* www.i2.com

RHYTHM®

A typical enterprise solution set spans multiple applications, which have complex inter-relationships. In order to make intelligent decisions, it is necessary to have visibility into the data that resides across an entire supply chain network. This facilitates the creation of an optimal plan for better customer service, more inventory turns and better margin optimization. RhythmLink™ provides the enabling data flow technology for multiple applications to extract and translate data even through the use of different data models.

i2 Technologies delivers a new set of solutions that enable BPO, or Business Process Optimization—a new layer of decision intelligence for planning and optimizing across multiple enterprises. BPO tightly integrates forward-thinking supply chain planning with every key business process—from superior product design to better customer relationships. With BPO, your enterprise connects front-end Web applications with back-end process optimization for intelligent eBusiness.

Current Business Environment

Many applications currently used today, including Enterprise Resource Planning, Advanced Planning and Scheduling, Customer Relationship Management and custom or legacy in-house systems, are designed and built with different goals and application models. Therefore, they use different data models, and integrating between many different applications requires several point-to-point integrations.

In many cases, integration can only be accomplished by creating complex script files and/or utilizing multiple middleware tools. RhythmLink eliminates the need for these. Maintenance of integration is reduced by storing the data flows and mapping processes for re-use in a central repository. Using filtering capabilities and one-to-many data sourcing reduces the total amount of data being sent throughout the network.

What is RhythmLink?

Through a simple user interface, RhythmLink provides the capability to connect and navigate through various data sources and enterprise applications. These data sources are accessed using industry standard protocols and embedded middleware tools such as Sequelink, EDA/SQL, ODBC and Oracle OCI to access databases, ALE and RFC to access SAP Orbix for CORBA, Microsoft DCOM and a connection to the RHYTHM® message bus adapters for connecting to Message-Oriented Middleware. Users can join information from these different sources. For example, if customer data such as sales, manufacturing, engineering and marketing information is spread across Enterprise Resource Planning solutions, warehouses and databases, RhythmLink can join the data from the different sources to deliver a complete customer data set. Filtering allows information to be reduced to the

RHYTHMLINK

i2

minimum dataset required by the destination. For example, if a manufacturing plan is being sent to the transaction system, it could be compared to the last plan stored and those orders which had not been changed could be filtered out, leaving only a "net-change" plan. The "net-change" plan could then be disseminated to various destinations, each with its own respective format and destination type. This allows for true "many-to-many" integration without the significant overhead that many tools have. RhythmLink is a memory-resident tool that has been optimized for large transaction sets. It is a fast processor of transactions, both in real time and in batch.

The RHYTHM Advantage

RhythmLink is an easy-to-use tool that allows the definition and execution of information access, manipulation and movement, as well as the events that make these possible. RhythmLink connects to various information sources, such as relational databases, CORBA or DCOM objects and to specific enterprise applications such as SAP. RhythmLink is different from traditional "MiddleWare" as it is configurable by an end user and the information accessed can be massaged before being sent to the data destination. Data source/destination mappings can be saved and reused, usually in "black-box" fashion, behind the scenes of an application.

Key Benefits

There are a number of key benefits to using RhythmLink:

- easy data access from various information sources
- reduction of time required to integrate applications
- reduction of risk after go-live
- reduction in amount of data flow between applications

Since RhythmLink is built over popular middleware tools and has a simple user interface, users can gain access to multiple information sources at one time without having to know each source's particular format. For example, to integrate SAP, RHYTHM and data from an AS400, RhythmLink can directly connect to SAP R/3, get data from the AS/400, join and filter the data as necessary and send the data as CORBA objects to RHYTHM. To set this up, the user simply needs to point to the various data sources, create the copy maps and execute. RhythmLink can speed up implementations by hiding the underlying technology while easing the user data mapping process. By reducing the time needed to create interfaces, the overall project risk decreases, as there is less dependence on scarce technical resources as well as less total project effort required.

With its ability to easily access information from multiple sources, filter this data and then disseminate it to multiple destinations, RhythmLink can significantly reduce the time, cost, effort and risk of integrating applications. Once applications are integrated, RhythmLink can minimize the risks and costs associated with support by keeping all the integration logic in one central location.

Delivering Value

i2's intelligent eBusiness solutions have already generated significant customer value. By focusing on the key business drivers within a supply chain, i2 solutions enable companies to improve customer service, profitability, return on assets and competitive position. On average, i2 customers realize quantifiable business benefits within three to six months of implementation, with full payback achieved within a year.

RhythmLink

open connectivity—RhythmLink

A typical supply chain spans multiple enterprises which have complex supply/demand relationships between them. In order to make intelligent decisions, visibility into the data that resides across the network is necessary to create an optimal plan for better delivery performance, inventory turns and margin optimization, etc. RhythmLink provides the enabling technology for the RHYTHM application server to access the information, and deliver the decision-support information to users across the entire supply chain. In addition to providing the above capability, RhythmLink's architecture is designed to support:

- *Scalability*

- *Flexibility*

- *Open integration environment based on industry standards*

i2's RhythmLink product family supports a multi-tier, client/server architecture that consists of the following layers or tiers:

RhythmLink for data

Provides the capability to graphically navigate through all the various data sources and enterprise applications. The data sources may be both relational or non-relational databases, various types of files, etc.

RhythmLink for applications

Allows other applications such as ERP systems or other partner applications to interact with RHYTHM through standard messaging technologies such as CORBA, DCOM, etc. Specific partner application integration technologies can also be accommodated.

RhythmLink for presentation

Enables users to access and interact with the RHYTHM engines using standard methods and tools such as Visual Basic, Microsoft Excel, etc. For example, through the RHYTHM ODBC-compliant engine interface, users can access "live" planning data for analyses and updates. RhythmLink provides an integration environment that supports connectivity using standard middleware tools and technologies such as DCOM, CORBA, ODBC, etc. The use of industry-based standards offers users multiple options to interact with the RHYTHM application via a common and well-known user environment.

i2 Technologies

RhythmLink continued

data sources

The supply chain model within RHYTHM requires data input that may originate from either a database or another application. The more prevalent data sources supported by RhythmLink that exist within an enterprise technology infrastructure include:

database access and manipulation

RhythmLink utilizes popular middleware tools such as Sequelink, EDA/SQL and ODBC to access relational databases including Oracle, Informix, etc. Native database access to Oracle is supported. Support for non-relational databases such as IMS, AS400 and other popular data sources is available as well.

The data within these databases can be imported into or exported from RHYTHM when requested. Users will also be able to view data within RHYTHM as if it were another relational database through ODBC-compliant clients. An Excel interface to directly view and manipulate planning information in a spreadsheet is also available.

flat files

Support for ASCII files is provided by RhythmLink. A proprietary batch client interface is also supported. Flat files can be used to create a "quick-start" interface which allows users to begin using RHYTHM right away while a more robust interface is built in parallel. Typically, the cost of this "quick-start" interface is easily recouped by the immediate benefit gained using RHYTHM.

application integration

Using open technologies such as DCOM or CORBA, applications can interact with RHYTHM through distributed objects. i2 even supplies standard 'planning objects' that can be utilized or mapped to by the cooperating application.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter-and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2 we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas   75039   USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   *net* www.i2.com

open connectivity—RhythmLink

A typical enterprise solution set spans multiple applications which have complex inter-relationships. In order to make intelligent decisions, visibility into the data that resides across an entire supply chain network is necessary. This facilitates the creation of an optimal plan for better customer service, more inventory turns, better margin optimization, etc. RhythmLink provides the enabling technology for applications to send and receive information and deliver the information to the users. In addition, RhythmLink is designed to be:

- *scalable*
- *flexible*
- *fast at transaction processing*
- *an open integration environment based on industry standards*

the solution

RhythmLink is an easy to use tool that allows the definition and execution of information access, manipulation and movement, as well as the events to make it happen. RhythmLink connects to various information sources, such as relational databases, CORBA or DCOM objects and to specific Enterprise Applications such as SAP. RhythmLink is different from traditional "MiddleWare" as it is configurable by an end user and the information accessed can be massaged as necessary before being sent to the data destination. Data source/destination mappings can be saved and reused, usually in a 'black-box' fashion, behind the scenes of an application.

the benefits

There are a number of key benefits to using RhythmLink:

- *easy data access from various information sources*
- *reduction of time required to integrate applications*
- *reduction of risk after go-live*
- *reduction in amount of data flow between applications*

Since RhythmLink is built over popular middleware tools and has a simple user interface, users can gain access to multiple information sources at one time without having to know each source's particular format. For example, to integrate SAP, RHYTHM and data from an AS400, RhythmLink can parse SAP IDOC's, get data from the AS/400, join and filter the data as necessary and send the data as CORBA objects to RHYTHM. To set this up, the user just needs to point to the various data sources, create the copy maps and execute.

RhythmLink can speed up implementations by hiding the underlying technology while easing the user data mapping process. By reducing the time to create interfaces, the overall project risk is reduced as there is less dependence on scarce technical resources as well as reducing the total project effort.

RhythmLink _continued_

In the past, integration was done by creating complex script files and/or utilizing multiple middleware tools. RhythmLink eliminates the need for these. Maintenance of integration is reduced by storing the data flows and mapping processes for re-use in a central repository.

Using the filtering capabilities and the one-to-many data sourcing, the total amount of data being sent throughout the network will be reduced.

RhythmLink features

Through the simple user interface, RhythmLink provides the capability to connect to and navigate through various data sources and enterprise applications. These data sources are accessed using industry standard protocols and embedded middleware tools such as Sequelink, EDA/SQL, ODBC and Oracle OCI to access databases, ALE and RFC to access SAP Orbix for CORBA, Microsoft DCOM and a connection to the Rhythm Global Message Bus for connecting to Message Oriented Middleware.

Users can join information from these different sources. For example, if customer data such as sales, manufacturing, engineering and marketing information is spread across Enterprise Resource Management solutions, warehouses and databases, RhythmLink can join the data from the different sources to deliver a complete customer data set.

Filtering allows information to be reduced to the minimum dataset required by the destination. For example, if a manufacturing plan is being sent to the transaction system, it could be compared to the last plan stored and those orders which had not been changed could be filtered out, leaving only a "net change" plan.

The "net change" plan could then be disseminated to various destinations, each with their own respective format and destination type. This allows for true "many-to-many" integration without the significant overhead that many tools have.

RhythmLink is a memory resident tool that has been optimized for large transaction sets. It is a very fast processor of transactions, both in real-time and in batch.
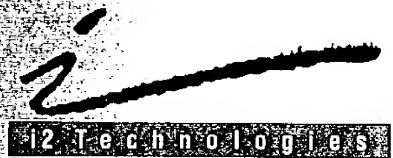
summary

With its ability to easily access information from multiple sources, filter this data and then to disseminate it to multiple destinations, RhythmLink can significantly reduce the time, cost, effort and risk of integrating applications. Once applications are integrated, RhythmLink can minimize the risks and costs associated with support by keeping all the integration logic in a simple, central location.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter- and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies®

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas 75039 USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   _net_ www.i2.com

RHYTHM®

data integration

RHYTHM provides intelligent decision-support to plan and optimize inter- and intra-enterprise supply chains.

- advanced scheduling
- demand planning
- distribution planning
- manufacturing planning
- master planning
- order promising
- transportation planning

i2 Technologies

The Intelligent Solution.

The broad scope of global supply chain management requires many applications to work together to provide a seamless solution. These applications include Enterprise Resource Planning (ERP) systems, order management systems, product configurators, Advanced Planning Systems (APS), and execution systems such as Shop Floor Control and Freight Management. These elements represent some of the major components within an enterprise solution. As the leading provider of supply chain decision support and optimization systems, i2 Technologies recognizes that integration of its RHYTHM solution with various complementary technologies is critical to providing a meaningful and usable solution for its customers.

what are different types of integration?

Full integration of the planning process can be achieved where the entire supply chain is always aware of the current state of demand and supply. Depending upon the scope of the specific planning application, integration can range from simple batch file transfers between applications to fully integrated planning and scheduling that includes a real-time exchange of data and decision support. Other considerations such as the number of data sources, control events regarding who initiates what process, and the availability of timely data also determine the integration strategy deployed.

what enabling technology is used for integration?

i2 Technologies' RhythmLink provides the enabling technology that allows the RHYTHM planning engine to integrate with partner applications and systems in order to deliver decision-support capabilities to users throughout the entire supply chain. The RhythmLink architecture offers:

flexibility

RhythmLink offers several integration options that allow enterprises to quickly deploy RHYTHM and accelerate the time-to-benefit. As the data and planning process become more sophisticated, the level of integration can be upgraded as well.

scalability

RhythmLink provides the capability to efficiently manage the huge volumes of data associated with large supply chains, as well as the number of users accessing it.

standards-based open environment

RhythmLink provides an integration environment that supports current and emerging technology standards in the areas of databases, object-oriented development, and distributed computing.

what types of applications or data sources can I integrate?

RhythmLink is a multi-tiered, client-server solution that provides a single graphical interface which speeds integration of data sources and enterprise applications. The data sources can be relational or non-relational databases, or contain various types of file structures. RhythmLink also allows other applications such as ERP systems and other partner applications to interact with RHYTHM through standard messaging technologies such as CORBA and DCOM. Partner applications with specific integration points such as SAP™, SSA, and Oracle can also be accommodated.

key capabilities of RHYTHM data integration

comprehensive database integration

RhythmLink utilizes popular middleware tools including SequeLink, EDA/SQL, and standards such as ODBC to access relational databases including Oracle, Informix, and others. Native database access to Oracle is also supported in addition to non-relational databases such as IMS, AS400, and other popular data sources. The data within these databases can be imported into or exported from RHYTHM based on triggering events or these transfers can be initiated on demand. Users can view the data within a RHYTHM model as though it were another relational database through ODBC-compliant clients. An Excel interface to directly view and manipulate planning information via a spreadsheet is also supported.

integration with ERP systems

RhythmLink supports closed-loop integration between the RHYTHM family of products and other ERP systems. The benefits of this tightly-coupled integration include:

- *allowing users to enter information into one system and ensure the accessibility and accuracy of the same information across the other application, eliminating duplicate data entry,*

- *providing data entry and ownership at one point-the source module-and synchronization of reference (common) data as necessary in a business environment,*

- *allowing for real-time or near real-time planning and addressing rapidly changing environments and true "what-if" capability based on the current status of the supply chain,*

- *providing superior performance and the rapid transfer of data,*

- *providing interfaces that are pre-defined, and that do not need to be rewritten for each implementation.*

"quick-start" integration capabilities

Using ASCII file transfer and a proprietary batch client interface, RhythmLink provides the capability to create a "quick-start" interface that allows users to begin using the RHYTHM application immediately while a more robust interface is being built in parallel. The cost of this "quick-start" interface is easily recouped within a short timeframe from the results of the RHYTHM implementation.

application integration

Using open technologies such as DCOM or CORBA, applications can interact with RHYTHM through distributed objects. i2 even supplies standard 'planning objects' that can be utilized or mapped to by the cooperating application.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter- and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor, and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

The Intelligent Solution

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas 75039 USA
tel 214-860-6000 800-800-3288
fax 214-860-6060
e-mail info@i2.com *net* www.i2.com

command center

view the whole supply chain at a glance

Today's supply chains are actually a complex web of sites for manufacturing, distributing and selling goods connected by a vast assortment of transportation resources. Whether it is obtaining visibility within an enterprise or leveraging third parties in logistics and manufacturing to create a virtual corporation, the supply chain is the dominant influence. Visibility and the ability to react to market change are required to drive logistics flow. The RHYTHM Command Center provides a tailorable command and control center for inter-enterprise material and order visibility and an integrated link to the RHYTHM advanced planning and optimization products.

Strategic uses of the RHYTHM Command Center include:

- *Managing Channel Postponement: A manufacturer or distributor who needs to link inbound material with focused assembly coordination either in a manufacturing or distribution facility located close to the consumer.*

- *Monitoring Logistics Flow: Shared logistics organizations providing logistics flow and routing capabilities to its internal and external customers.*

- *Linking Plans and Execution: Linkage of deployment plans created by RHYTHM with in-transit inventory and proactive notification of execution failures, plus real-time performance monitoring of customer service and variability in demand and supply.*

- *Ensuring Customer Service: RHYTHM Command Center can be implemented as a "demand chain" performance workstation which combines delivery commitments with an Estimated Time of Arrival monitoring measurement.*

- *Managing Operations: A strategic operations center for managing third party logistics, transportation, co-packers and outsourced manufacturing and assembly operations.*

In this environment, the ability to see the scope of the manufacturing and distribution operations is essential. In addition, with many events occurring across the supply chain simultaneously, effective visibility of exceptions is essential.

The RHYTHM Command Center provides a single graphical view of the supply chain with clear, visual cues of exception events. Planners and managers can use the RHYTHM Command Center to navigate quickly throughout their domain of control, drill down into the planning information on any operation or site and directly resolve exceptions. This capability dramatically improves the effectiveness and efficiency of supply chain managers and reduces the risk of unplanned events jeopardizing enterprise performance.

command center *continued*

an integrated view of the enterprise

Traditional planning systems provide only limited capability to integrate information across the enterprise. By using the RHYTHM Command Center, you will have unprecedented visibility into your operations. The RHYTHM Global Decision Support Architecture (GDSA) provides innovative, object-based, collaborative planning tools, the results of which can be monitored using the RHYTHM Command Center.

To provide this integrated vision beyond the RHYTHM GDSA, the RHYTHM Command Center also provides extensive messaging integration. In particular, the RHYTHM Command Center can integrate messages in standard EDI format, for tracking private fleet and third-party logistics operations and for arms-length, collaborative planning.

performance monitoring and measurement

The RHYTHM Command Center is a unique supply chain management system which provides a graphical model of the entire supply chain of an organization and presents a real-time picture of the performance of the individual elements of the chain as well as the supply chain's overall performance. The graphical nature of the application makes it extremely intuitive to use and allows Supply Chain Managers to concentrate on the business of managing supply chains.

the RHYTHM advantage

The RHYTHM Command Center combines the best features of RHYTHM products. It is a quick way to get comprehensive information about your operations. The underlying technology of RHYTHM allows for fast, constraint-based planning across multi-enterprise supply chain operations. The advanced planning and optimization technology inherent in RHYTHM products is represented in the plans monitored by the RHYTHM Command Center.

leading edge technology

The RHYTHM Command Center combines leading technologies in advanced planning and optimization in the RHYTHM planning products with the leading supply chain visualization tool. This combination provides the speed and flexibility you need to manage the ever-changing needs of your business.

As a part of the RHYTHM Global Decision Support Architecture (GDSA), the RHYTHM Command Center presents data from all the planning tools in the enterprise, plus it can be quickly and easily integrated with Enterprise Resource Management systems from vendors such as SAP, Oracle Manufacturing, J.D. Edwards and SSA, as well as specialized advanced planning and optimization and execution tools.

i2 Technologies is the leading provider of intelligent solutions that satisfy the complex requirements of inter-and intra-enterprise supply chains.

i2's decision-support solutions are deployed across a wide variety of industries including apparel, automotive, consumer goods, electronics, industrial products, metals, paper, pharmaceutical, semiconductor and textile industries.

At i2, we are dedicated to providing our customers with the highest level of business value.

i2 Technologies

909 E. Las Colinas Blvd. 16th Floor
Irving, Texas   75039   USA
tel 214-860-6000, 800-800-3288
fax 214-860-6060
e-mail info@i2.com   *net* www.i2.com